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TRAN, MAI T	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/034,689	SATISH JAMADAGNI, NANJUNDA SWAMY	
	Examiner	Art Unit	
	Mai T. Tran	2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/24/2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-63* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-63* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

REMARKS

Applicant's amendment dated October 24, 2005 responding to the April 22, 2005 Office Action provided in the rejection of claims 1-63, wherein claims 6, 10, 27, 30, 37, 46, and 50 have been amended. Claims 1-63 remain pending in the application and which have been fully considered by the examiner.

The Examiner withdraws the objection to the drawings, the objection to the specification, the objection to claims 27 and 57 for the minor informalities, and the rejection under 35 U.S.C. 112 second paragraph of claims 6, 10, 30, 37, 46, and 50 corresponding to Applicant's amendment.

CLAIM REJECTIONS - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims **1-18, 22-31, 33-39, 41-58, and 62-63** are rejected under 35 U.S.C. 102(b) as being anticipated by "Computational Intelligence for Distributed Fault Management in Networks Using Fuzzy Cognitive Maps", by Ndousse et al, hereinafter Ndousse.

Claim 1

A method to diagnose a problem from multiple events in a system of managed components generating real-time events of problems, comprising:

forming fuzzy cognitive maps (FCMs) including causally equivalent FCM fragments using network element interdependencies derived from a database defining the network managed objects and event notifications that convey the state of one or more managed objects (page 1559, left col., lines 36-37;

sampling generated incoming real-time events from the system (page 1558, left col., lines 5-8); and

diagnosing problems by mapping the sampled events to the formed FCM fragments (page 1558, left col., line 20).

Claim 2

The method of claim 1, wherein forming the FCM fragments comprises:

determining event nodes from events in the database;

identifying concept nodes from the determined event nodes; and

forming FCM fragments including interdependencies between the concept and event nodes using the determined event nodes and the identified concept nodes (page 1559, left col., lines 41-42, page 1560, paragraph under Figure 5).

Claim 3

The method of claim 2, wherein diagnosing the sampled events comprises:

mapping the sampled real-time events to the formed FCM fragments including determined event nodes to evaluate the effect of the mapped event nodes on the identified concept nodes using the determined interdependencies;

identifying the problems by analyzing the concept nodes based on the outcome of the evaluation; and

diagnosing the problems based on the outcome of the analysis (page 1559, Figure 2).

Claim 4

The method of claim 3, wherein the system comprises:

a system selected from the group consisting of explicit system, implicit system, centralized system, partially centralized system, and distributed system (page 1558, title).

Claim 5

The method of claim 3, wherein the events comprise:

exceptional conditions occurring in the operation of the network (page 1558, left col., lines 32-33).

Claim 6

The method of claim 5, wherein the event nodes comprise:

significant events selected from the group consisting of hardware failures, software failures, performance bottlenecks, configuration problems, and security violations (page 1558, left col., lines 32-33).

Claim 7

The method of claim 6, wherein determining the event nodes comprises:

determining the event nodes from a database defining the network managed objects and event notifications that convey the state of one or more managed objects. Examiner interprets the database as Management Information Base. Official notice is taken that a Management Information Base (MIB) is a set of objects that represents various types of information about a device, used by a network management protocol to manage the device.

Claim 8

The method of claim 7, wherein determining the event nodes further comprises:

determining the event nodes from expert knowledge of the network (page 1559, left col., lines 1-3).

Claim 9

The method of claim 8, wherein the managed objects comprise:

objects selected from the group consisting of network objects, attached systems, and application objects (page 1558, right col., line 10).

Claim 10

The method of claim 8, wherein the database comprises:

static information associated with each class of managed or dynamic information that affects the causal propagation of events (page 1558, right col., last 2 lines). Examiner interprets the database as Management Information Base. Official notice is taken that a Management Information Base (MIB) is a set of objects that represents various types of information about a device, used by a network management protocol to manage the device.

Claim 11

The method of claim 3, wherein sampling the incoming real-time events comprises:

sampling the incoming real-time events sequentially in the order they are received (page 1558, left col., lines 5-8).

Claim 12

The method of claim 3, wherein identifying the concept nodes comprises:

identifying a composite set of events that capture the notion of an abstract exception condition in the network (page 1560, Figure 5).

Claim 13

The method of claim 12, wherein the abstract exception condition comprises:

abstract exception conditions selected from the group consisting of a notion of fault and a notion of performance degradation, a network card in a communication system being faulty with the number of users being served by the communication system drastically reducing, and link between two routers going down leading to the use of alternate paths which lead to congestion and performance (page 1561, left col., lines 10-11, 14, right col., lines 1-3).

Claim 14

The method of claim 12, wherein capturing the abstract exception condition comprises:

capturing normal paths based on predetermined criteria on which the events have to be diagnosed (page 1558, left col., lines 6-10).

Claim 15

The method of claim 14, wherein the criteria comprises:

causal and temporal inconsistencies between events (page 1558, left col., lines 6-10).

Claim 16

The method of claim 1, wherein forming the FCM, comprises:

capturing system event interdependencies (page 1559, left col., lines 36-40).

Claim 17

The method of claim 15, wherein capturing the system event interdependencies comprises:

interconnecting event and concept nodes using interdependency arcs capturing temporal and logical dependencies (page 1559, left col., lines 36-40).

Claim 18

The method of claim 17, wherein the interdependency arcs comprise:

weights based on temporal and logical dependencies (page 1559, left col., lines 42-45).

Claim 22

A method for diagnosing problems from multiple events in a communication network including managed components generating real-time events of problems, comprising:

forming fuzzy cognitive maps (FCMs) including causally equivalent FCM fragments using network element interdependencies (page 1559, left col., lines 36-37);

sampling generated incoming real-time events from the network (page 1558, left col., lines 5-8); and

diagnosing each of the generated problems by mapping the received sampled events to the formed FCM fragments (page 1558, left col., line 20).

Claim 23

The method of claim 22, wherein forming the FCM fragments comprises:

determining event nodes from events in the database;

identifying concept nodes from the determined event nodes; and

forming FCM fragments including interdependencies between the concept and event nodes using the determined event nodes and the identified concept nodes (page 1559, left col., lines 41-42, page 1560, paragraph under Figure 5).

Claim 24

The method of claim 23, wherein diagnosing the sampled events comprises:

mapping the sampled real-time events to the formed FCM fragments including determined event nodes to evaluate the effect of the mapped event nodes on the identified concept nodes using the determined interdependencies;

identifying the problems by analyzing the concept nodes based on the outcome of the evaluation; and

diagnosing the problems based on the outcome of the analysis (page 1559, Figure 2).

Claim 25

A computer readable medium having computer-executable instructions to diagnose problems from multiple events in a system of managed components generating real-time events of problems, comprising (page 1562, right col., lines 18-21):

forming fuzzy cognitive maps (FCMs) including causally equivalent FCM fragments using network element interdependencies derived from a database defining the network managed objects and event notifications that convey the state of one or more managed objects (page 1559, left col., lines 36-37);

sampling generated incoming real-time events from the system (page 1558, left col., lines 5-8); and

diagnosing problems by mapping the sampled events to the formed FCM fragments (page 1558, left col., line 20).

Claim 26

The computer readable medium of claim 25, wherein forming the FCM fragments comprises:

determining event nodes from events in the database;

identifying concept nodes from the determined event nodes; and

forming FCM fragments including interdependencies between the concept and event nodes using the determined event nodes and the identified concept nodes (page 1559, left col., lines 41-42, page 1560, paragraph under Figure 5).

Claim 27

The computer readable medium of claim 26, wherein diagnosing the sampled events comprises:

mapping the sampled real-time events to the formed FCM fragments including determined event nodes to evaluate the effect of the mapped event nodes on the identified concept nodes using the determined interdependencies;

identifying the problems by analyzing the concept nodes based on activation levels of the concept nodes; and

diagnosing the problems based on the outcome of the analysis (page 1559, Figure 2).

Claim 28

The computer readable medium of claim 27, wherein the system comprises:

a system selected from the group consisting of explicit system, implicit system, centralized system, partially centralized system, and distributed system (page 1558, title).

Claim 29

The computer readable medium of claim 28, wherein the events comprise:

exceptional conditions occurring in the operation of the network (page 1558, left col., lines 32-33).

Claim 30

The computer readable medium of claim 29, wherein the event nodes comprise:

significant events selected from the group consisting of hardware failures, software failures, performance bottlenecks, configuration problems, and security violations (page 1558, left col., lines 32-33).

Claim 31

The computer readable medium of claim 27, wherein identifying the concept nodes comprises:

identifying a composite set of events that capture the notion of an abstract exception condition in the network (page 1560, Figure 5).

Claim 33

A computer system to diagnose problems from multiple events in a system of managed components generating real-time events of problems, comprising:

a storage device;

an output device; and

a processor programmed to repeatedly perform a method, comprising (page 1562, right col., lines 18-21). Software is run on a computer system. Official notice is taken that a computer comprises a storage device, an output device, and a processor:

forming fuzzy cognitive maps (FCMs) including causally equivalent FCM fragments using network element interdependencies derived from a database defining the network managed objects and event notifications that convey the state of one or more managed objects (page 1559, left col., lines 36-37);

sampling generated incoming real-time events from the system (page 1558, left col., lines 5-8); and

diagnosing problems by mapping the sampled events to the formed FCM fragments (page 1558, left col., line 20).

Claim 34

The system of claim 33, wherein forming the FCM fragments comprises:

determining event nodes from events in the database;

identifying concept nodes from the determined event nodes; and

forming FCM fragments including interdependencies between the concept and event nodes using the determined event nodes and the identified concept nodes (page 1559, left col., lines 41-42, page 1560, paragraph under Figure 5).

Claim 35

The system of claim 34, wherein diagnosing the sampled events comprises:

mapping the sampled real-time events to the formed FCM fragments including determined event nodes to evaluate the effect of the mapped event nodes on the identified concept nodes using the determined interdependencies;

identifying the problems by analyzing the concept nodes based on the outcome of the evaluation; and

diagnosing the problems based on the outcome of the analysis (page 1559, Figure 2).

Claim 36

The system of claim 35, wherein the events comprise:

exceptional conditions occurring in the operation of the network (page 1558, left col., lines 32-33).

Claim 37

The system of claim 35, wherein the event nodes comprise:

significant events selected from the group consisting of hardware failures, software failures, performance bottlenecks, configuration problems, and security violations (page 1558, left col., lines 32-33).

Claim 38

The system of claim 35, wherein identifying the concept nodes comprises:

identifying a composite set of events that capture the notion of an abstract exception condition in the network (page 1560, Figure 5).

Claim 39

The system of claim 35, wherein forming the FCM, comprises:

capturing system event interdependencies by interconnecting event and concept nodes using interdependency arcs that capture temporal and logical dependencies (page 1559, left col., lines 36-40).

Claim 41

An event-correlation system to diagnose problems from multiple incoming real-time events in a communication network of managed components generating real-time events of problems, comprising:

an event-analyzer to form fuzzy cognitive maps (FCM) fragments using network element interdependencies derived from a database defining the network managed objects and event notifications that convey the state of one or more managed objects (page 1559, left col., lines 36-37); and

an event-processing module coupled to the event-analyzer to sample generated incoming real-time events from the network (page 1558, left col., lines 5-8), wherein the analyzer to diagnose the problems from the sampled events by mapping the sampled events to the formed FCM fragments (page 1558, left col., line 20).

Claim 42

The event-correlation system of claim 41, wherein the analyzer forms FCM fragments by determining event nodes from events in the database, and by further identifying concept nodes from the determined event nodes to form FCM fragments including interdependencies between the identified concept nodes and the determined event nodes (page 1559, left col., lines 41-42, page 1560, paragraph under Figure 5).

Claim 43

The event-correlation system of claim 41, wherein the analyzer further maps the sampled events to the formed FCM fragments including determined event nodes to evaluate the effect of the mapped events on the determined concept nodes using the determined interdependencies, wherein the analyzer identifies the problems by analyzing the concept nodes based on the outcome of the evaluation and further diagnoses the problems based on the outcome of the analysis (page 1559, Figure 2).

Claim 44

The event-correlation system of claim 43, wherein the communication network comprises:

a system selected from the group consisting of explicit system, implicit system, centralized system, partially centralized system, and distributed system (page 1558, title).

Claim 45

The event-correlation system of claim 43, wherein the events comprise:

exceptional conditions occurring in the operation of the network (page 1558, left col., lines 32-33).

Claim 46

The event-correlation system of claim 45, wherein the event nodes comprise:

significant events selected from the group consisting of hardware failures, software failures, performance bottlenecks, configuration problems, and security violations (page 1558, left col., lines 32-33).

Claim 47

The event-correlation system of claim 46, wherein the analyzer determines the event nodes from a database defining the network managed-objects and event notifications that convey the state of one or more managed objects. Examiner interprets the database as Management Information Base. Official notice is taken that a Management Information Base (MIB) is a set of objects that represents various types of information about a device, used by a network management protocol to manage the device.

Claim 48

The event-correlation system of claim 47, wherein the analyzer determines the event nodes from expert knowledge of the network (page 1559, left col., lines 1-3).

Claim 49

The event-correlation system of claim 48, wherein the managed objects comprise:

objects selected from the group consisting of network objects, attached systems, and application objects (page 1558, right col., line 10).

Claim 50

The event-correlation system of claim 48, wherein the database comprises:

static information associated with each class of managed objects or dynamic information that affects the casual propagation of events (page 1558, right col., last 2 lines). Examiner interprets the database as Management Information Base. Official notice is taken that a Management Information Base (MIB) is a set of objects that represents various types of information about a device, used by a network management protocol to manage the device.

Claim 51

The event-correlation system of claim 43, further comprising:

a communication interface module coupled between the network and the event-processing module to extract events from real-time messages received in different formats from the network and to further sample the extracted events sequentially in the order they are received (page 1558, left col., lines 5-8).

Claim 52

The event-correlation system of claim 43, wherein the analyzer identifying the concept nodes comprises a composite set of events that capture a notion of an abstract exception condition in the network (page 1560, Figure 5).

Claim 53

The event-correlation system of claim 52, wherein the abstract exception condition comprises conditions selected from the group consisting of a notion of fault and a notion of performance degradation (page 1561, left col., lines 10-11, 14, right col., lines 1-3).

Claim 54

The event-correlation system of claim 52, wherein the analyzer captures the abstract exception condition by capturing normal paths based on predetermined criteria from which for the events are diagnosed (page 1558, left col., lines 6-10).

Claim 55

The event-correlation system of claim 54, wherein the criteria comprises:

causal and temporal inconsistencies between events (page 1558, left col., lines 6-10).

Claim 56

The event-correlation system of claim 43, wherein the analyzer forms FCM by capturing system event interdependencies (page 1559, left col., lines 36-40).

Claim 57

The event-correlation system of claim 56, wherein the analyzer captures system interdependencies by interconnecting event and concept nodes using interdependency arcs to capture temporal and logical dependencies (page 1559, left col., lines 36-40).

Claim 58

The event-correlation system of claim 57, wherein the interdependency arcs comprise:

weights based on temporal and logical dependencies (page 1559, left col., lines 42-45).

Claim 62

The event-correlation system of claim 43, further comprising:

an interface output module coupled to the event-analyzer to output one or more solutions based on the outcome of diagnosing the problems by the analyzer (page 1562, right col., lines 18-21). Software is run on a computer system. Official notice is taken that a computer comprises a storage device, an output device, and a processor.

Claim 63

The event-correlation system of claim 62, further comprising:

a memory to store the static and dynamic information. Official notice is taken that a computer comprises a memory.

CLAIM REJECTIONS - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject

matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims **19-21, 32, 40, and 59-61** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ndousse as applied to claims 1-18, 22-31, 33-39, 41-58, and 62-63 above, in view of "Contextual Fuzzy Cognitive Map for Decision Support in Geographic Information Systems" by Zhi-Qiang Liu et al, hereinafter Liu, and further in view of "Cognitive maps and fuzzy implications" by Thierry Marchant, hereinafter Marchant.

Claim 19

Ndousse discloses substantially all of applicant's claimed invention with the exception of the computation of an indirect effect of events. Liu teaches the computation of an indirect effect on concepts in an FCM using the claimed equation. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify Ndousse as taught by Liu for the purpose of decision support based on the degree to which one concept affects another.

Liu does not expressly disclose the computation of the bounded difference. Marchant teaches the computation of the bounded difference using the claimed equation which is the fuzzy equivalents of the AND logical connective of two sets. Therefore, it would have been obvious at

the time the invention was made to a person having ordinary skill in the art to combine Ndousse and Liu as taught by Marchant in order to find what are the elements of a system on which we eventually could act in order to modify the system based on the bound and domain.

The method of claim 3, wherein evaluating the effect of the received event nodes on the concept nodes, comprises:

computing an indirect effect of events (predictive event-correlation) on concept nodes using the equations:

$$I_{px}(E_i, C_j) = \min(e_{px}(E_i, C_j)) = \min(e_{px_{r1}}(E_i, E_k)) \oplus \ldots\ldots \oplus \min(e_{px_{rn}}(E_{kn}, C_j))$$

wherein the indirect effect of events E_i on concept nodes C_i can be defined as the intersection of the linked causal types and can be described by the above equation, e_{px} is a function which takes I_{ij} to [0,1] in path 'p' i.e. $e_{Iij} = f \rightarrow (I_{ij}, \mu_{ij})$, $\mu_{ij} \in \{0,1\}$, and $\oplus$ represents a concatenation of paths, wherein the concatenation operator $\oplus$ is generally considered as a fuzzy 'and' operator, wherein the operator (t-norm) for intersection of two fuzzy sets other than 'min' can be used using a 'bounded difference', wherein the bounded difference can be computed using the equation:

$$t_1(\mu_A(x), \mu_B(x)) = \max\{0, \mu_A(x) + \mu_B(x) - 1\}$$

wherein $t_1()$ is a t-norm between fuzzy sets A and B with membership functions μ_A and μ_B.

Claim 20

The method of claim 19, wherein mapping the received real-time events to the formed FCM fragments comprises:

correlating the received events to the identified concept nodes to evaluate the effect of the received event nodes on the identified concept nodes using the determined element interdependencies (page 1559, Figure 2).

Claim 21

The method of claim 20, wherein correlating the received events to the concept nodes further comprises:

accumulating evidence based on the received event nodes;

comparing the accumulated evidence to a threshold value; and

analyzing the concept nodes based on the outcome of the comparing to evaluate the effect of the received event nodes (page 1559, right col.)

Claim 32

The computer readable medium of claim 27, wherein evaluating the effect of the received event nodes on the concept nodes, comprises:

computing an indirect effect of events on concept nodes using the equation:

$$I_{px}(E_i, C_j) = \min(e_{px}(E_i, C_j)) = \min(e_{px_{r1}}(E_i, E_k)) \oplus \ldots\ldots \oplus \min(e_{px_{rn}}(E_{kn}, C_j))$$

wherein the indirect effect of events E_i on concept nodes C_i can be defined as the intersection of the linked causal types and can be described by the above equation, e_{px} is a function which takes I_{ij} to [0,1] in path 'p' i.e. $e_{Iij} = f \rightarrow (I_{ij}, \mu_{ij})$, $\mu_{ij} \in \{0,1\}$, and $\oplus$ represents a concatenation of paths, wherein the concatenation operator $\oplus$ is generally considered as a fuzzy 'and' operator, wherein the operator (t-norm) for intersection of two fuzzy sets other than 'min' can be used using a 'bounded difference', wherein the bounded difference can be computed using the equation:

$$t_1(\mu_A(x), \mu_B(x)) = \max\{0, \mu_A(x) + \mu_B(x) - 1\}$$

wherein $t_1()$ is a t-norm between fuzzy sets A and B with membership functions μ_A and μ_B.

Claim 40

The system of claim 35, wherein evaluating the effect of the received event nodes on the concept nodes, comprises:

computing an indirect effect of events on concept nodes using the equation:

$$I_{px}(E_i, C_j) = \min(e_{px}(E_i, C_j)) = \min(e_{px_{r1}}(E_i, E_k)) \oplus \ldots\ldots \oplus \min(e_{px_m}(E_{km}, C_j))$$

wherein the indirect effect of events E_i on concept nodes C_i can be defined as the intersection of the linked causal types and can be described by the above equation, e_{px} is a function which takes I_{ij} to [0,1] in path 'p' i.e. $e_{Iij} = f \rightarrow (I_{ij}, \mu_{ij})$, $\mu_{ij} \in \{0,1\}$, and $\oplus$ represents a concatenation of paths, wherein the concatenation operator $\oplus$ is generally considered as a fuzzy 'and' operator, wherein the operator (t-norm) for intersection of two fuzzy sets other than 'min' can be used using a 'bounded difference', wherein the bounded difference can be computed using the equation:

$$t_1(\mu_A(x), \mu_B(x)) = \max\{0, \mu_A(x) + \mu_B(x) - 1\}$$

wherein $t_1()$ is a t-norm between fuzzy sets A and B with membership functions μ_A and μ_B.

Claim 59

The event-correlation system of claim 43, wherein the analyzer evaluates an indirect effect of events on concept nodes using the equations:

$$I_{px}(E_i, C_j) = \min(e_{px}(E_i, C_j)) = \min(e_{px_{r1}}(E_i, E_k)) \oplus \ldots\ldots \oplus \min(e_{px_m}(E_{km}, C_j))$$

wherein the indirect effect of events E_i on concept nodes C_i can be defined as the intersection of the linked causal types and can be described by the above equation, e_{px} is a function which takes I_{ij} to [0,1] in path 'p' i.e. $e_{Iij} = f \rightarrow (I_{ij}, \mu_{ij})$, $\mu_{ij} \in \{0,1\}$, and $\oplus$ represents a concatenation of paths, wherein the concatenation operator $\oplus$ is generally considered as a fuzzy 'and' operator, wherein the operator (t-norm) for intersection of two fuzzy sets other than 'min' can be used using a 'bounded difference', wherein the bounded difference can be computed using the equation:

$$t_1(\mu_A(x), \mu_B(x)) = \max\{0, \mu_A(x) + \mu_B(x) - 1\}$$

wherein $t_1()$ is a t-norm between fuzzy sets A and B with membership functions μ_A and μ_B.

Claim 60

The event-correlation system of claim 59, wherein the analyzer maps the received real-time events to the formed FCM fragments by correlating the received events to the identified concept nodes to evaluate the effect of the received event nodes on the identified concept nodes using the determined element interdependencies (page 1559, Figure 2).

Claim 61

The event-correlation system of claim 59, wherein the analyzer correlates the received events by accumulating evidence based on the received event nodes and compares the accumulated evidence to a threshold value, and analyzes the concept nodes based on the outcome of the comparing to evaluate the effect of the received event nodes (page 1559, right col.)

RESPONSE TO ARGUMENTS

Applicant argues on page 19:

1. **Rejection of claims 1-18, 22-31, 33-39, 41-58, and 62-63 under 35 U.S.C. § 102(b):**

that Ndousse does not discuss:

- FCM fragments, only FCMs: in response to the argument, Ndousse does teach the above-mentioned limitation. FCM fragments are inherent in FCMs because creating FCM fragments involves finding relationships between concepts (applicant's own words in the specification, page 23, line 11). Ndousse teaches using the concept of Fuzzy Cognitive Maps with the nodes denote managed objects or concepts, while the arcs denote fault. Therefore, FCMs establish a relationship between concepts.
- Creating FCM fragments using network element interdependencies derived from a database: in response to the argument, Ndousse does teach the above limitation. Please see Office Action dated April 22, 2005 regarding claims 1 and 7.
- Event notifications that convey the state of one or more managed objects: in response to the argument, Ndousse does teach the cited limitation. Please see Office Action dated April 22, 2005 regarding claims 1 and 7.
- Sampling generated incoming real-time events from the system: in response to the argument, Ndousse does teach the cited limitation. Please see Office Action dated April 22, 2005 regarding claim 1.

- Diagnosing problems by mapping the sampled events to the formed FCM fragments: in response to the argument, Ndousse does teach the cited limitation. Please see Office Action dated April 22, 2005 regarding claim 1.

Examiner maintains the rejection as Ndousse does teach each and every element of the invention as claimed.

2. **Rejection of claims 19-21, 32, 40, and 59-61 under U.S.C. § 103(a)**: as being unpatentable over Ndousse as applied to claims 1-18, 22-31, 33-39, 41-58, and 62-63 above, in view of "Contextual Fuzzy Cognitive Map for Decision Support in Geographic Information Systems" by Zhi-Qiang Liu et al, hereinafter Liu, and further in view of "Cognitive maps and fuzzy implications" by Thierry Marchant, hereinafter Marchant. Examiner maintains the rejection as Ndousse, in view of Liu, and further in view of Marchant do teach each and every element of the invention as claimed.

CONCLUSION

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

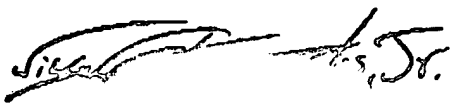
however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

CORRESPONDENCE INFORMATION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mai T. Tran whose telephone number is (571) 272-4238. The examiner can normally be reached on M-F 9:00am-- 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Vincent can be reached on (571) 272-3080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



M.T.T
Patent Examiner
Date: 12/8//2005

Wilbert L. Starks
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